

habits. This little animal takes up its abode in any empty univalve shell, which continues to form its habitation until its increasing size renders it necessary for it to abandon it for a larger. It often happens that it fixes upon one already tenanted by another of its species, and a desperate struggle ensues, which is rarely discontinued until either one or both be disabled.

The few shells that are to be found on the beach in the Straits are small and common, such as the *Solen truncatus*, or truncated razor-sheath; the *Mya nicobarica*, or Nicobar trough-shell, or gaper; the *Venus decussata*, or decussated Venus; the *Murex tribulus*, or thorny woodcock; the *Murex rana*, or frog Murex; the *Mytilus plicatus*, or plaited muscle; the *Trochus indicus*, or Indian top; and *Voluta auris Midæ*, Midas's ear volute.

The entomology of the Straits presents a wide field for the naturalist, but several circumstances prevented my turning my attention to it. The few specimens that I had an opportunity of noticing are as follows:—the Atlas moth; the *Papilio memnon*, or Memnon butterfly; the *Papilio pamnon*, or Pamnon butterfly; the *Locusta citrifolia*, or lemon-leaved locust; the *Phyllium sic-cifolia*, or walking-leaf; the *Scarabæus rhinoceros*, or rhinoceros beetle; the *Libellula clavata*, or club-shaped dragon-fly; and the *Libellula tricolor*, or tricoloured dragon-fly.

L.—*Description of some new Genera and Species of British Entomostraca.* By W. BAIRD, M.D. &c.

[With a Plate.]

Legion BRANCHIOPODA.

Order LOPHYROPODA.

Section 1. *Cladocera.*

IN the genus *Daphnia*, as elaborated by Milne Edwards in his 'History of the Crustacea,' there are two species which are so anomalous in their characters that it becomes necessary to separate them from the true *Daphniæ*, and even to form a distinct genus for each. These are the *D. cornuta* and the *D. rosea*. The latter I have already in a previous paper (Ann. Mag. Nat. Hist. xi. 87) given my reasons for removing from the genus *Daphnia*, and constituting for it the genus *Macrothrix*, and the former I have shortly characterized as a new genus in the 'Transactions of the Berwickshire Naturalists' Club' for 1845, p. 149.

The genus *Daphnia* of Müller was revised by Straus in the 'Mém. du Mus. d'Hist. Nat.' iv., and split into three genera, the generic characters being taken from the number of joints in the

inferior or large antennæ, the *rami* of Straus. In these three genera, which have been all adopted by Milne Edwards, the superior antennæ (antennules of M. Edwards) in most of the species are exceedingly small compared with the inferior, so much so indeed, as almost to have escaped the notice of Müller altogether. They are also situated beneath the beak. In the two species however which I have mentioned above, they are very much larger than in the others, and instead of springing from the head under the beak, hang pendulous from or are articulated to the beak itself. In the *Daphnia rosea* (*Macrothrix roseus*) they are flat, one-jointed and distinctly pendulous from the beak, occupying such a position that they cannot be mistaken or overlooked.

In the *Daphnia cornuta* however, from the extremely minute size of the little animal, they have been hitherto constantly misunderstood by observers, and though much too large and prominent to be overlooked, they have been described as a totally different organ. Having last autumn met with this curious little creature in great abundance in the water from the Hampstead ponds, I have been enabled to place it under a microscope of high power, and have thus succeeded in ascertaining the real structure and position of these organs. In the notices of this species by Müller, Jurine and M. Edwards, the antennules are not mentioned at all, but the animal is described as possessing a long beak*; and certainly at first sight and with a low magnifying power these organs appear as being merely a prolongation of the anterior part of the head, similar to what we see in many of the *Lynceidæ*. This is not so however, and upon a careful investigation I have found this apparent beak to consist of two long, curved, cylindrical bodies, consisting each of about twenty small articulations, and united to the beak or anterior part of the head by a distinct joint. In structure these organs resemble very much the antennæ of the *Cyclopidae*, but like the antennules of the other *Daphniæ* possess very little motion. Müller considered this animal to be a *Lynceus*, and led away by the above-mentioned resemblance to the beak of many of that genus, he has described it under the name of *L. longirostris*†. Jurine has described it under the division of *Monoculi* belonging to the group of the *Daphnidæ*, under the name of *Monoc. cornutus*, and has been followed by Desmarest and M. Edwards. In the 'Ann. Mag. Nat. Hist.' I have also described it under the name of *Daph. cornuta*, not having then distinctly seen the structure of the antennules. These are so peculiar however in their structure and position, and so distinct from those of the other *Daphnidæ*, that in the 'Trans.

* "Le bec est long et gros."—*Edwards*.

† Entomostraca, p. 76. t. 10. f. 7, 8.

Berw. Nat. Club ' for 1845, I have proposed forming a distinct family for receiving all those species of the genera *Daphnia* and *Lynceus* of Müller that have the antennules pendulous from the beak. In the 'Ann. Mag. Nat. Hist.' xi. p. 87, I have arranged the genus *Macrothrix*, provisionally, under the fam. *Lynceidæ*, as it possesses only three articulations to each joint of the large antennæ, and has also the black point in front of the eye. I have now ascertained however that it has not the articulated abdomen nor the convoluted intestine that form such distinguishing marks in the *Lynceidæ*, being in these respects formed like the *Daphnidæ*. It cannot thus be received into that family, and as in its position of antennules it agrees with the *D. cornuta*, I now propose arranging it in the same family. The two families and genera will be thus characterized :—

Fam. I. DAPHNIDÆ.

Two pairs of antennæ; superior very small and situated under the beak, inferior large, two-branched, and used as organs of locomotion. Five pairs of feet. Head prolonged into a more or less obtuse beak. Eye single, large. Intestine straight.

This family contains two British genera, *Daphnia* and *Sida*. (Trans. Berw. Nat. Club, 1845, p. 148.)

Fam. II. BOSMINIDÆ.

Two pairs of antennæ; superior longer than in preceding family, and pendulous from or articulated to the extremity of the beak. In other respects as in *Daphnidæ*.

This family contains two British genera, *Bosmina* and *Macrothrix*.

Gen. 1. *MACROTHRIX*, Baird, *Ann. Mag. Nat. Hist.* xi. p. 87.

Superior antennæ flat, consisting of only one articulation. Inferior antennæ large, two-branched, each branch having three articulations. Second articulation of anterior branch provided with a very long seta. Eye accompanied with a black spot.

Gen. 2. *BOSMINA*, Baird, *Trans. Berw. Nat. Club*, 1845.

Superior antennæ long, curved, cylindrical, and consisting of many articulations. Inferior antennæ large, two-branched, one branch having four, the other three articulations.

Sp. 1. *Bosmina longirostris*. Pl. IX. B. f. 1.

Syn. *Lynceus longirostris*, Müller, *Entom.* 76. t. 10. f. 7, 8.—*Monoculus cornutus*, Jurine, *Hist. Nat. des Monoc. de Genève*, 142. t. 14. f. 8–10.—*Daphnia cornuta*, Desmarest, *Consid. gén. Crust.* 375; Baird, *Ann. Mag. Nat. Hist.* i. 257. t. 9. f. 15; M. Edwards, *Hist. Nat. Crust.* iii. 382.—*Bosmina cornuta*, Baird, *Trans. Berw. Nat. Club*, 1845.

This animal is very small. The shell is rounded on the posterior margin, bulging out anteriorly, and terminating at inferior angle in a sharp point or spine, which projects straight downwards. The superior antennæ consist of twenty articulations; the seven first are short and close to each other; at the seventh two or three setæ spring, projecting forwards and upwards; then follow thirteen articulations, each one longer than the preceding. It requires a strong magnifying power to make out this articulated structure distinctly. Like the antennules of the *Daphnidæ* and *Lynceidæ* they appear to be almost destitute of motion, and thus, when seen close to each other, they certainly bear a close resemblance to a prolongation of the beak. The inferior antennæ, though strong bodies, are much shorter than in most of the *Daphnidæ*. The anterior branch has four articulations, the posterior only three. They are furnished with long filaments, which are not plumose. The ova are few in number. The motion of this curious little creature through the water is caused by numerous and very rapid strokes of its inferior antennæ or rami, being in that respect very similar to the *Lynceidæ*. The males I have never yet met with.

Section 2. Ostracoda.

The genus *Cypris* as established by Müller has hitherto remained intact. As however a number of the species which have been described possess a set of organs which many others do not, and which exercise a decided influence upon their œconomy and habits, I think it becomes incumbent upon us to separate the two sets of species into distinct genera. In the one set the animals have a much greater degree of motion and agility than the others, swimming freely and rapidly through the water in all directions, and apparently possessing a higher degree of enjoyment in their existence. This arises from a bundle of long plumose setæ which spring from the second articulation of the pediform antennæ (the first pair of feet of Müller and others), and by means of which they can suspend themselves in the water or transport themselves through it with great facility. The other set are deficient in this apparatus, and instead of swimming gaily through the limpid element, crawl in the mud at the bottom of the pools in which they are found, or creep along the aquatic plants which grow there, and if dropped into a glass of water fall to the bottom without being able to suspend themselves for the shortest time. They thus form a connecting link between the genera *Cypris* and *Cythere*.

I propose characterizing them thus:—

Gen. 1. CYPRIS, Müller.

Two pairs of feet, one pair always contained within the shell.

Abdomen terminated by a long, slender, bifid tail. Posterior or pediform antennæ furnished with a bundle of long setæ, generally plumose. Animal swims freely in the water.

The *Cypris tristriata*, Baird, Trans. Berw. Nat. Club, i. p. 99. t. 3. f. 13, (the *C. pubera*, Baird, Mag. of Zool. Bot. i. p. 524. t. 16. f. 1—13,) will serve as the type of this genus.

Gen. 2. CANDONA, Baird, Trans. Berw. Nat. Club, 1845, vol. ii. p. 152.

Two pairs of feet, one pair contained within the shell. Abdomen terminated by a long, slender, bifid tail. Pediform antennæ not furnished with a bundle of long setæ. Animal creeps at the bottom or upon aquatic plants, &c.

The *Cypris reptans*, Baird, Mag. Zool. Bot. i. p. 135. t. 5. f. 5, will serve as the type.

Gen. 3. CYTHERE, Müller.

Three pairs of feet, all external to the shell. Abdomen short and blunt. Pediform antennæ not furnished with a bundle of long setæ, but possessing one stout articulated filament. Animal creeps at the bottom or upon submerged plants, &c.

Genus CYPRIS.

Sp. 1. *C. elliptica*, n. s. Pl. IX. f. 2.

Nearly elliptical in shape, of a light green colour clouded with darker patches of the same colour on the sides of the shell. Hairy round the edges, but otherwise glabrous. Pediform antennæ provided with five or six long setæ.

Hab. Pond at Highgate. British Museum.

Sp. 2. *C. sella*, n. s. Pl. IX. f. 3.

Shell somewhat elliptical in shape, and rather globose, about half the size of preceding, of a uniform light greenish colour, marked on the back and side with a patch of a dark colour. A dark streak runs along the upper edge of the shell, beginning from immediately behind the eye and terminating at about the same distance from posterior extremity. It there extends a short way down the side and then runs forward a little way in a somewhat lunated shape. At the anterior commencement of the dorsal mark a narrower streak of the same colour runs down the side, stopping only a short distance from anterior margin. The shell is densely set all round with hairs. Pediform antennæ provided with long setæ (f. 3 a). This species resembles a little the *C. vidua* in shape, but is smaller and differs very considerably in the markings, which are uniformly the same.

Hab. Pond on Clapham Common. Brit. Mus.

Genus CANDONA.

Sp. 1. *C. similis*, n. s. Pl. IX. f. 4.

Shell somewhat elliptical in figure, flattish, slightly sinuated in middle of anterior edge, white with two dark orange-coloured spots on the back. It is smooth, except round the edges, which are beset with some rather stiff hairs, more numerous at anterior extremity than posterior, transparent, rather larger at anterior extremity than posterior. The feet have one long curved claw and one short. Pediform antennæ (f. 4 a) have three strong curved claws at their extremities, but no bundle of long setæ. It creeps upon the plants, &c. at the bottom of the water, and when it walks it leisurely puts first one foot forward, then the other.

It approaches *Cypris detecta*, Müller; the posterior extremity however is narrower than the anterior, which is the reverse in the *detecta*.

Hab. Pond on Clapham Common.

Section 3. *Copepoda*.

The genus *Cyclops* of Müller, composed of very heterogeneous materials, required reform, and has accordingly been reviewed by M. Edwards, who, in his great work on the Crustacea, distinguishes three different genera. The characters of these he takes from the structure of the second or inferior pair of antennæ and the foot-jaws. In his genus *Cyclopsina* however he includes two species of *Cyclops* described by Müller, which are very different from each other and cannot be placed together. The chief character of the genus *Cyclopsina* is the branched nature of the second or inferior pair of antennæ, a character which agrees well with the structure of these organs in the *Cyclops cæruleus* of Müller, but not with his *C. minutus*, in which the inferior antennæ are simple and not branched. I propose dividing this family into the following genera:—

Fam. CYCLOPIDÆ.

Head distinct from body, not possessing a moveable beak; body consisting generally of four, abdomen of six segments; foot-jaws two pairs, sometimes small; legs about five pairs; one eye.

Genus 1. *CYCLOPS*, Müller.

Foot-jaws large and strong, branched; second or inferior pair of antennæ simple; external ovaries double.

The *C. quadricornis*, Müll., is the type of the genus.

Genus 2. *CYCLOPSINA*, M. Edwards.

Foot-jaws of considerable magnitude, simple; second or inferior pair of antennæ branched; external ovary single.

The *Cyc. cæruleus*, Müller (*Monoc. Castor*, Jurine), is the type of this genus.

Genus 3. CANTHOCARPUS, Westwood MSS.

Foot-jaws small, simple ; second or inferior pair of antennæ simple ; ovary single.

The *Cyc. minutus*, Müll., is the type of the genus.

Genus 4. ARPACTICUS, M. Edwards.

Foot-jaws possessing strong hooked claws at their extremity ; second or inferior pair of antennæ simple ; external ovary single.

The *Cyc. chelifer*, Müll., is the type of this genus.

Genus 5. ALTEUTHA, Baird.

Foot-jaws small, simple ; body flat ; two strong falciform appendages from fifth segment of body.

The *Cyclops depressus*, Baird, is the type and only known species of this genus.

Genus ARPACTICUS.

Spec. *A. nobilis*, Baird, Trans. Berw. Nat. Club, 1845.

Pl. IX. f. 5.

Thoracic and abdominal portions of body distinct from each other. The thorax is composed of four segments and is large and rounded. Abdomen consists of six slender segments, the last bilobed, and giving off two long and two short setæ. The whole insect is beautifully coloured with green, red and purple. Eye large, of a ruby colour. Antennæ (f. 5 *a*) short, of seven segments, all setiferous ; the two first short and stout, the third much longer, toothed on upper edge and giving off at its extremity several long setæ ; four last small and short. Antennules (f. 5 *b*) composed of two segments, the first giving off a shoot from about the middle of its length, the second terminating in several stout setæ. The mandibles and anterior or first pair of foot-jaws are strong, and resemble the same organs in *Cyclops quadricornis*. Posterior foot-jaws (f. 5 *c*) shorter and stouter than those of typical species, and consisting of two joints and a terminal hooked claw. Thoracic pair of feet (f. 5 *d*) differ from abdominal ones. They consist of two stalks rising from a common base ; the anterior or upper stalk consisting of one long joint, and a very short one which terminates in a strong claw ; the posterior or inferior stalk is very short, toothed on the edge and giving off several stout setæ. The abdominal feet resemble those of the typical species, the setæ with which they and the fulera are provided being all plumose. The fulera are the same also as in the other species. The setæ of the tail however are not plumose. This species is at least three times larger than the *chelifer*, and has the body more rounded and much stouter.

Hab. Berwick Bay.